

Application No. 09/888,668

**REMARKS**

In the office action mailed September 9, 2005, the Examiner rejected claims 1, 2, and 9 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,597,813 to Stanich et al. ("Stanich"). The Examiner also rejected claims 3 - 6, 7, 8, and 10 - 15 under 35 U.S.C. §103(a) as being unpatentable over Stanich in view of U.S. Patent No. 4,668,995 to Chen et al. ("Chen"). Applicant respectfully traverses these rejections.

In forming the rejection of claims 1 and 9, the Examiner alleges that Stanich discloses a screen wherein substantially all the threshold values corresponding to gray levels between  $g_{s1}$  and  $g_{s2}$  coincide with black positions in a constraining checkerboard pattern and substantially all the threshold values corresponding to gray levels between  $g_{s2}$  and  $g_{s3}$  coincide with white positions in the constraining checkerboard pattern at col. 3, lines 29-37. The Examiner further alleges that Stanich discloses not placing pixels vertically or horizontally adjacent to each other until after a gray level threshold (col. 5, lines 30-36) and that utilizing the checkerboard pattern (col. 5, lines 16-19), this limits using a constrained checkerboard pattern until a gray level threshold is reached. In response to Applicants submissions that  $g_{s2}$  corresponds to a black dither that is lighter than  $g_{s3}$ , the Examiner states that such limitation is not included in the independent claims 1 and 9 and therefore, a  $g_{s1}$  level of 100%, a  $g_{s2}$  level of 50%, and a  $g_{s3}$  level of 0% would fulfill the limitation of  $g_{s1} > g_{s2} > g_{s3}$ .

The Applicant respectfully submits that the Examiner has failed to set out a prima facie case of anticipation of claims 1 and 9. Initially, the Applicant submits that in forming the rejection the Examiner was incorrect in his interpretation of the claim in alleging that a greater gray level corresponds to a darker dither. Such an interpretation of the claims is entirely inconsistent with

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(and in fact contradicts) the plain meaning of gray level as defined by and used in the specification as well as the meaning and use of the term in the dependent claims themselves. Moreover, such interpretation is inconsistent with the use of gray level in the prior art reference Chen cited by the Examiner. Notwithstanding the above, with this response the Applicant has amended claims 1 and 9 to include the limitation that gray levels are defined as  $0 < g_s < 2^m$  where a gray level  $g_s = 0$  corresponds to 100% black and a gray level  $g_s = 2^m$  corresponds to 0% black. Such a definition is consistent with the meaning of gray level as set out in the specification and as used in the claims.

As stated above, the Applicant respectfully submits that the Examiner has failed to set out a prima facie case of anticipation of claims 1 and 9 as Stanich fails to teach or suggest each of the elements of Applicant's claims 1 and 9. In particular, Stanich does not teach or suggest a screen wherein substantially all the threshold values corresponding to gray levels between  $g_{s1}$  and  $g_{s2}$  coincide with black positions in a constraining checkerboard pattern and substantially all the threshold values corresponding to gray levels between  $g_{s2}$  and  $g_{s3}$  coincide with white positions in the constraining checkerboard pattern, wherein  $g_{s1} > g_{s2} > g_{s3}$  and wherein the gray level  $g_{s3}$  corresponds to a black dither of 50% or less.

A close reading of Stanich reveals that the text cited by the Examiner, the text at col. 3 lines 29-37, col. 5 lines 16-19 and lines 30-36, and col. 6 lines 61-66 simply does not and cannot support the Examiner's assertion regarding the teachings of Stanich. The cited text of col. 3 simply states that the when generating screens using the method disclosed in Stanich that a clustering requirement can be turned on or off for different gray levels. The text at col. 5 lines 30-36 provides that immediate horizontal or vertical neighbors is one option for determining the property of one pixel being adjacent to another for the purpose of clustering and cites diagonal

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relationships as another option. The text at col. 5, lines 16-19 simply provides that when selecting an initial sequence of patterns, the patterns can be periodic and that one example of a periodic pattern is "where the black pixels are arranged in a checkerboard pattern." Finally, the text at col. 6 lines 61-66 simply states that a large threshold array can be built up using a small threshold array which itself is arranged as cells in a larger periodic array.

Using the teachings from Stanich set out above, the Examiner contends that not placing pixels vertically or horizontally adjacent to each other until after a gray level threshold when the initial patterns includes the checkerboard pattern will limit using a constrained checkerboard pattern (*i.e.*, black pixels will, by definition, correspond only to black squares within the checkerboard) until a gray level threshold is reached. Assuming, for argument, that the above statement is taught, what the Examiner does not state or identify any teaching within Stanich or elsewhere of screens in which the threshold values corresponding to gray levels between  $g_{s2}$  and  $g_{s3}$  coincide with white positions in the constraining checkerboard pattern wherein the gray level  $g_{s3}$  corresponds to a black dither of 50% or less and the gray level  $g_{s2}$  corresponds to a black dither that is less than (*i.e.*, lighter than) that of  $g_{s3}$ . That is, the screens for some set of gray levels corresponding to a black dither of 50% or less, the black pixels added for those gray levels constrained to white squares on a checkerboard pattern. Moreover, such a teaching is inconsistent with, and thus cannot be taught by, Stanich. More specifically, as Stanich teaches that the initial patterns must satisfy the subset requirement (*i.e.*, any pixel that is black in a lighter gray level must also be black the darker gray level), if one uses the checkerboard pattern, one cannot place the black pixels on white squares for black dither of 50% or less.

As set forth above, the Examiner has failed to make a *prima facie* rejection under 102(e) and claims 1 and 9 are allowable over the art of record. Thus, the rejection of claims 1 and 9 should be withdrawn. Claims 2 – 5, 14

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and 15 depend from claim 1 and claims 10 - 13 depend from claim 9. Thus, as claims 1 and 9 are allowable, claims 2 - 5 and 10 - 15 are also allowable.

Claims 3 - 6, 7, 8, and 10 - 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Stanich and Chen. The Applicant respectfully submits that the Examiner has failed to set out a prima facie case of obviousness for claims 3 - 6, 7, 8, and 10 - 15. In addition, Applicant respectfully submits that in forming the rejection under 35 U.S.C. §103(a), the Examiner has impermissibly relied on hindsight in characterizing the teachings of Stanich and Chen.

The Applicant respectfully submits that the combination of Stanich and Chen does not teach or suggest a method of generating a halftone screen which includes generating an initial screen pattern being designed to provide a visually pleasing, blue noise dot pattern when thresholded and wherein substantially all black pixels in the initial screen pattern correspond to black pixels in a constraining checkerboard pattern. As support for such step, the Examiner cites to block 21 of Fig. 2, col. 5, lines 9-37. The cited text merely states that "the patterns  $P_i$  are (possibly periodic) patterns which look pleasant" and that "For example, one of the patterns could be where the black pixels are arranged in a checkerboard pattern." This simply does not and cannot be said to teach or suggest an initial screen pattern being designed to provide a visually pleasing, blue noise dot pattern when thresholded and wherein substantially all black pixels in the initial screen pattern correspond to black pixels in a constraining checkerboard pattern. That the patterns are (possibly periodic) patterns which look pleasant might suggest a pattern generating a blue noise pattern but it cannot be said to teach or suggest a pattern wherein substantially all black pixels in the initial screen pattern correspond to black pixels in a constraining checkerboard pattern. Moreover, the phrase "For example, one of the patterns could be where the black pixels are arranged in a checkerboard pattern" merely teaches a standard

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checkerboard and cannot be said to teach or suggest a visually pleasing, blue noise dot pattern wherein substantially all black pixels in the screen pattern correspond to black pixels in a constraining checkerboard pattern. The Applicant respectfully suggests that the only way one could interpret Stanich as teaching Applicant's claimed method would be to rely on impermissible hindsight in forming the rejection.

The Applicant respectfully submits that the combination of Stanich and Chen also fails to teach or suggest a method of generating a halftone screen which includes (B) generating a subsequent screen pattern corresponding to a specific gray level that is darker than the first gray level, the subsequent screen pattern maintaining the arrangement of black pixels of any screen pattern corresponding to a lighter gray level and further including at least one more black pixel, wherein the least one more black pixel is at a location corresponding to a black pixel in the constraining checkerboard pattern; (C) repeating (B) for a plurality of specific gray levels between the first gray level and a second gray level; (D) generating a second subsequent screen pattern corresponding to a specific gray level that is darker than the second gray level, the second subsequent screen pattern maintaining the arrangement of black pixels of every screen pattern corresponding to a lighter gray level and further including at least one more black pixel, wherein the least one more black pixel is at a location corresponding to a white pixel in the constraining checkerboard pattern; and (E) repeating (D) for a plurality of gray levels between the second gray level and a third gray level wherein the third gray level corresponds to a black dither of 50% or less.

In particular, the Applicant notes that Stanich and Chen whether taken alone or in combination do not teach or suggest a method of generating a halftone screen which includes generating a screen pattern for a gray level that is darker than a second gray level, the screen pattern maintaining the arrangement of black pixels of every screen pattern corresponding to lighter

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gray levels and further including at least one more black pixel, wherein the least one more black pixel is at a location corresponding to a white pixel in the constraining checkerboard pattern and repeating the generation of a screen pattern for a plurality of gray levels between the second gray level and a third gray level wherein the third gray level corresponds to a black dither of 50% or less.

As discussed with respect to the rejection of claims 1 and 9, the Examiner does not identify any teaching within Stanich or Chen that when generating screens the method constrains added pixels for a plurality of specific gray levels between the first gray level and a second gray level to black squares in a constraining checkerboard pattern and constrains added pixels for a plurality of specific gray levels between the second gray level and a third gray level to white squares in a constraining checkerboard pattern. As previously discussed, such a teaching is inconsistent with and, thus, cannot be taught by Stanich. More specifically, as Stanich teaches that the initial patterns must satisfy the subset requirement (*i.e.*, any pixel that is black in a lighter gray level must also be black the darker gray level). If one selects a pattern  $P_i$  that is a checkerboard pattern, which would by definition have 50% dither corresponding to black squares, one simply cannot place the black pixels on white squares for black dither of 50% or less while maintaining the subset requirement as taught by Stanich.

Moreover, the combination of Stanich and Chen do not teach or suggest constraining added pixels for a plurality of specific gray levels between the first gray level and a second gray level to black squares in a constraining checkerboard pattern and constraining added pixels for a plurality of specific gray levels between the second gray level and a third gray level to white squares in a constraining checkerboard pattern. Rather the cited art merely teaches that when building a screen, added pixels can be either subjected to a clustering criteria or not. The clustering criteria is described in

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Stanich as being an adjacent square or a horizontally or vertically adjacent square or a diagonally adjacent square; however, there is simply no teaching or suggestion of using two different clustering criteria for different sets of gray levels. Rather as described above, Stanich merely teaches using a clustering criteria (i.e., requiring pixels to be adjacent to existing pixels) or not using a clustering criteria (e.g., not requiring pixels to be adjacent to existing pixels).

As the Examiner has failed to make a prima facie rejection of claim 6 under 102(e), claim 6 is allowable over the art of record and the rejection should be withdrawn. As claims 7 and 8 depend from claim 6 they are also allowable.

In rejecting claims 3 - 6, 7, 8, and 10 - 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Stanich and Chen, the Examiner notes that Stanich does not disclose expressly a specific percent black dither that correspond to the first, second or third gray levels. The Examiner then alleges that Chen et al. disclose the specific gray level values claimed and that at the time of the invention, it would have been obvious to a person of ordinary skill in the art to assign thresholds between a first gray level, second gray level and third gray level to the values claimed and that the motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus increase image quality.

The Applicant respectfully disagrees with the Examiner's assertion that Stanich and Chen teach or suggest changing the constraint from black squares in a checkerboard pattern to white squares in a constraining checkerboard pattern at the claimed levels. Stanich simply does not teach or suggest threshold values corresponding to gray levels for constraining a checkerboard pattern as alleged. Rather Stanich merely teaches using a clustering constraint or not. As described above, the imposition of a clustering constraint or not as described by Stanich cannot be said to teach or suggest constraining added pixels for a plurality of specific gray levels between the first

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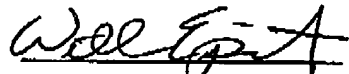
gray level and a second gray level to black squares in a constraining checkerboard pattern and constraining added pixels for a plurality of specific gray levels between the second gray level and a third gray level to white squares in a constraining checkerboard pattern. To assume for argument that the use of clustering criteria or not of Stanich does suggest the use of black and white checkerboard constraints of Applicant and that Stanich discloses a generic gray level from which to switch patterns and that such switching is done to increase image quality as the Examiner alleges, the cited text of Stanich teaches away from the claimed invention. The cited text (col. 8, lines 3-24 of Stanich) refers to figures four and five of Stanich which shows the switching of the use of clustering criteria or no clustering criteria only occurring for gray levels less than 20%. Moreover, even if it could be said that Stanich did disclose a generic gray level from which to switch checkerboard constraining patterns as claimed, Chen merely discloses various black dither levels that can be generated. The Applicant submits that Stanich and/or Chen do not teach or suggest changing the constraining pattern as claimed at the levels claimed. Moreover, Chen simply does not teach or suggest changing constraining criteria of any kind at any gray level let alone at the levels claimed by Applicant. As the Examiner has failed to make a prima facie case of obviousness under 35 U.S.C. §103(a), the rejection of claims 3 - 6, 7, 8, and 10 – 15 should be withdrawn.



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No additional fee is believed to be required for this amendment. However, the undersigned Xerox Corporation attorney hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Corporation Deposit Account No. 24-0025. This also constitutes a request for any needed extension of time and authorization to charge all fees therefor to Xerox Corporation Deposit Account No. 24-0025.

Respectfully submitted,



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